Cahlen Brancheau 154

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HW2

30/30

7

	A	B	Cycles
ALU	30	30	1
LOADS	75	60	2
BRANCHES	45	30	4
TOTAL	150	120	

a

	A	B
ALU	30/150 = .2 ⇒ 20%	30/120 = .25 ⇒ 25%
LOADS	75/150 = .5 ⇒ 50%	60/120 = .5 ⇒ 50%
BRANCHES	45/150 = .3 ⇒ 30%	30/120 = .25 ⇒ 25%

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b

$$CPI_A = \frac{(30*1)+(75*2)+(45*4)}{150} = 2.4$$

$$CPI_B = \frac{(30*1)+(60*2)+(30*4)}{120} = 2.25$$

5

c

$CCT_B = 1.2 * CCT_A$ $CPU = IC * CPI \times CCT$

$CPU_A = 150 * 2.4 \times CCT_A = 360 * CCT_A$

$CPU_B = 120 \times 2.25 \times 1.2 \times CCT_A = 324 \times CCT_A$

$\frac{A}{B} \Rightarrow \frac{360}{324} = 1.1\overline{1}$ A is 11% faster.

B is 11% faster

5

8

	A	B	Cycles
ALU	20	25	2
LOADS	40	50	4
BRANCHES	30	20	6
TOTAL	90	95	

a

	A		B	
ALU	20/90 = .22̄ ⇒	22.22%	25/95 = .2631 ⇒	26.31%
LOADS	40/90 = .44̄ ⇒	44.44%	50/95 = .5263 ⇒	52.63%
BRANCHES	30/90 = .33̄ ⇒	33.33%	20/95 = .2105 ⇒	21.05%

✓ 5

b

$$CPI_A = \frac{(20*2)+(40*4)+(30*6)}{90} = \boxed{4.22}$$

$$CPI_B = \frac{(25*2)+(50*4)+(20*6)}{95} = \boxed{3.89}$$

✓ 5

C

$$CCT_A = 1.15 * CCT_B$$

$$CPU_A = 90 * 4.22 * 1.15 CCT_B = 436.77 CCT_B$$
$$CPU_B = 95 * 3.89 * CCT_B = 369.55 CCT_B$$

$$\frac{A}{B} = \frac{436.77}{369.55} = \boxed{1.18}$$ A is 18% faster.

B is 18% faster

✓ 5